2

WINSLOW-LINDBERGH REGIONAL AIRPORT
Winslow, Arizona

AIRPORT MASTER PLAN - 1998
AVIATION DEMAND AND CAPACITY

INTRODUCTION

Forecasts of aviation activity serve as a guideline for the timing required for implementation of airport improvement programs. While such information is essential to successful comprehensive airport planning, it is very important to recognize that forecasts are only approximations of future activity, based upon historical data and from the standpoint of present situations. They therefore must be used with careful consideration, as they may lose their validity through the passage of time. For this reason, an ongoing program of examination of local airport needs, as well as national and regional trends, is recommended and encouraged in order to promote the orderly development of the Winslow-Lindbergh Regional Airport.

Air Traffic Control personnel maintain records of aircraft operations at towered airports. At airports which are not served by air traffic control towers, estimates of existing aviation activity are necessary in order to form a basis for the development of realistic forecast projections. These estimates are usually based upon a review of available historical data, as well as observations of activity, and contacts with airport users.

Following the development of the estimated current demand, projections are made based upon established growth rates, area demographics, industry trends and other important indicators. Forecasts are prepared for the Initial Term (five-year), the Intermediate Term (ten-year) and the Ultimate Term (fifteen and twenty-year) time frames. Having forecasts within these time frames will allow the construction of airport improvements to be timed to meet demand, but not so early as to remain idle for an unreasonable length of time.

Section approved by PAC 03/17/98

Types of Operations

There are four types of aircraft operations which are considered in the planning process. These are termed local, based, itinerant, and transient. They are defined as follows:

- **Local operations** are defined as aircraft movements (departures or arrivals) for the purpose of training, pilot currency or pleasure flying, within the immediate area of the local airport. These operations typically consist of touch-and-go operations, practice instrument approaches, flights to and within local practice areas, and pleasure flights which originate and terminate at the airport under study.

- **Itinerant operations** are defined as arrivals and departures other than local operations, as described above. This type of operation is closely tied to local demographic indicators, such as local industry and business use of aircraft and usage of the facility for recreational purposes.

- **Based aircraft operations** are defined as the total operations made by aircraft based at the airport under study, with no attempt to classify the operations as to purpose.

- **Transient operations** are defined as the total operations made by aircraft other than those based at the airport under study. These operations typically consist of business or pleasure flights originating at other airports, with termination or a stopover at the study airport.

FAA Aircraft Classifications

Aircraft are grouped by the FAA by wingspan into six *Airplane Design Groups*, and by approach speed into four *Approach Categories*. The airport design criteria and dimensional standards for airport facilities are related to the Airplane Design Groups, Approach Categories, and type of approaches offered, based on the minimum visibility required to legally execute an approach to landing, as follows:

- Visual;

- Instrument with visibility minimums of ¾ mile or greater;

- Instrument with visibility minimums less than ¾ mile.

The six Airplane Design Groups (ADG) and four Approach Categories are categorized in the tabulation below.

FAA AIRPLANE DESIGN GROUPS

ADG I	Wingspan up to but not including 49' (ie. Cessna 177, Cessna 210, Piper Cheyenne).
ADG II	Wingspan from 49', up to but not including 79' (ie. Cessna Citation II, Gulfstream II, III).
ADG III	Wingspan from 79', up to but not including 118'(ie. Boeing 737, Convair 580, Fairchild F-27).
ADG IV	Wingspan from 118', up to but not including 171' (ie. Convair 880, Boeing 707).
ADG V	Wingspan from 171', up to but not including 197' (ie. Boeing 747).
ADG VI	Wingspan from 197', up to but not including 262' (ie. Lockheed C-5A).

FAA AIRCRAFT APPROACH CATEGORIES

Category A	Approach speed less than 91 knots (ie. Cessna 182, Beechcraft Bonanza).
Category B	Approach speed 91 knots or more but less than 121 knots (ie. Piper Cheyenne, Cessna Citation).
Category C	Approach speed 121 knots or more but less than 141 knots (ie. Learjet 25, Rockwell Sabre 75A).
Category D	Approach speed 141 knots or more but less than 166 knots (ie. Learjet 35A, Grumman Gulfstream II).
Category E	Approach speed 166 knots or more (pertains only to military types).

Source: FAA AC 150/5300-13

FAA Airport Classifications

The FAA classifies airports by the type of traffic they experience, or are designed to accommodate. Each airport is assigned an *Airport Reference Code* (or *ARC*), which is a coding system used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the airport.

The ARC is a two-component code. The first component, depicted by a letter between A and E, corresponds to the Aircraft Approach Category of the design aircraft for that airport. The second component, depicted by a Roman numeral between I and VI, corresponds to the Airplane Design Group (ADG) of the design aircraft (see the table on the previous page).

Throughout the 1950's, 60's and 70's, and until the early 1980's, the Winslow airport had scheduled airline service. The last serving airlines (Frontier and Golden Pacific) used jet airliners such as the Douglas DC-9.

The 1980 Airport Layout Plan anticipated that scheduled jet service would continue and carried an Airport Role of "Basic Transport" throughout the ultimate planning term, but limited the pavement design strength to 60,000 pounds. The "Transport" category considered that the airport would serve many business and commuter turbojets and heavier transport-class aircraft. However, the lightest variation of the DC-9 operates at gross weights in excess of 77,000 pounds. Current commuter airlines are using smaller aircraft to serve smaller communities, with connector flights to larger cities. These aircraft include the Saab SF-340, Beechcraft 1900, and Fokker F-27, all of which are ARC B-II types.

There is currently no scheduled airline service at Winslow. However, the potential for future airline service is present, assuming that improvements are made to the airport facilities and that the area's economy continues to grow.

Most of the business jets which currently use the Winslow facilities are ARC B-I types such as the Lear 28, Sabreliner NA-265-40, and Cessna Citation I, ARC B-II types such as the Falcon 20, Falcon 50, and Sabreliner NA-265-65, ARC C-I types including the Lear 23 and Lear 25, and ARC C-II models such as the Gulfstream III.

Available Existing Activity Forecasts for Winslow

The establishment of an accurate basis for forecasting of future aviation activity is of primary importance in any planning effort. The recommended practice is to begin with the examination of prior estimates and forecast figures. Section 1 of this study includes a discussion of the prior regional, national and local planning documents which have included activity forecasting for Winslow. These are summarized in the following tabulation. Estimates of existing operations and based aircraft for Winslow were developed for and approved by the FAA and/or ADOT, and are documented in each of the referenced publications.

Summary of Prior Aircraft Activity Forecasts for Winslow-Lindbergh Regional Airport

Study		1987	1992	1997	2006
1987 Master Plan for Winslow Municipal Airport	Based Aircraft	(21)	23	25	28
	Operations	22,248	24,025	26,016	30,231

Study		1995	2000	2005	2010	2015
1995 Arizona State Aviation Needs Study	Based Aircraft	(13)	13	13	14	14
	Operations	20,539	20,539	20,539	22,119	22,119

Study		1997
National Plan of Integrated Airport Systems 1993-1997	Based Aircraft	22
	Operations	*n/a*

Study		1987	1995	1997	2000	2005	2010
1988 Arizona Aviation System Plan	Based Aircraft	(16)	20	21	22	25	29
	Operations	13,328	17,052	18,136	19,892	23,204	27,068

Study		1992	1995	1996	2000	2005
FAA Terminal Area Forecasts FY 1993-2005	Based Aircraft	(10)	*n/a*	*n/a*	*n/a*	*n/a*
	Operations	28,000	31,000	31,000	35,000	39,000

Study		1979	1984	1989	1999
1979 Master Plan for Winslow Municipal Airport	Based Aircraft	(37)	45	55	70
	Operations	19,425	23,625	28,875	36,750

Study		1983	1985	1990	1995	2000	2005
FAA Form 5010 and the 1983 and 1985 Airport Activity Surveys (ADOT)	Based Aircraft Form 5010 →	(31)	(25)	*n/a*	*n/a* (15)	*n/a*	*n/a*
	Operations (Estimated)	31,400	20,000	25,200	33,800	41,200	50,000

Figures in parenthesis ( ) were represented as actual in the referenced studies.
Others reflect estimated forecast values.

Airport Seasonal Use

Some level of seasonal fluctuation in aircraft operations may be expected at any airport. This fluctuation is most apparent in regions with colder winter weather patterns, at nontowered general aviation airfields. The fluctuation is less pronounced at major airports, with a high percentage of commercial and scheduled airline activity, and also at those facilities with a milder climate and/or a high percentage of training activity.

The Winslow climate provides a fairly stable environment for aviation activity. The winter weather is relatively mild and although daytime summer temperatures are typically in the 90's, the morning and evening hours are usually quite comfortable.

The probable seasonal use at Winslow was modeled by examination of the last six years of monthly fuel sales records, as provided by the Airport Manager. The fuel flowage was broken down by month and an average was calculated by summing the total for both Jet-A and 100LL for each month throughout the six-year period, then dividing by the total gallons sold during the six years of record. The fuel sales records are tabulated on the following page, and the resulting typical seasonal use curve is presented on page 2-8. For the purposes of comparison, a seasonal use curve which has been developed for non-towered airports with cold winter weather is also presented, along with the average seasonal use trend from the 1979-84 FAA records of aircraft operations handled by tower facilities nationally (from the FAA Statistical Handbook of Aviation).

The seasonal use curve that results from the records of fuel sales reflects a fairly accurate picture of the fluctuation in use of the airport. However, the records do not distinguish between fuel sold to the U.S. Forest Service and general aviation users. The highly seasonal nature of the U.S.F.S. activity is apparent in the curve. A peak in June of over 22% of total operations includes U.S.F.S. fire retardant missions during the peak fire season.

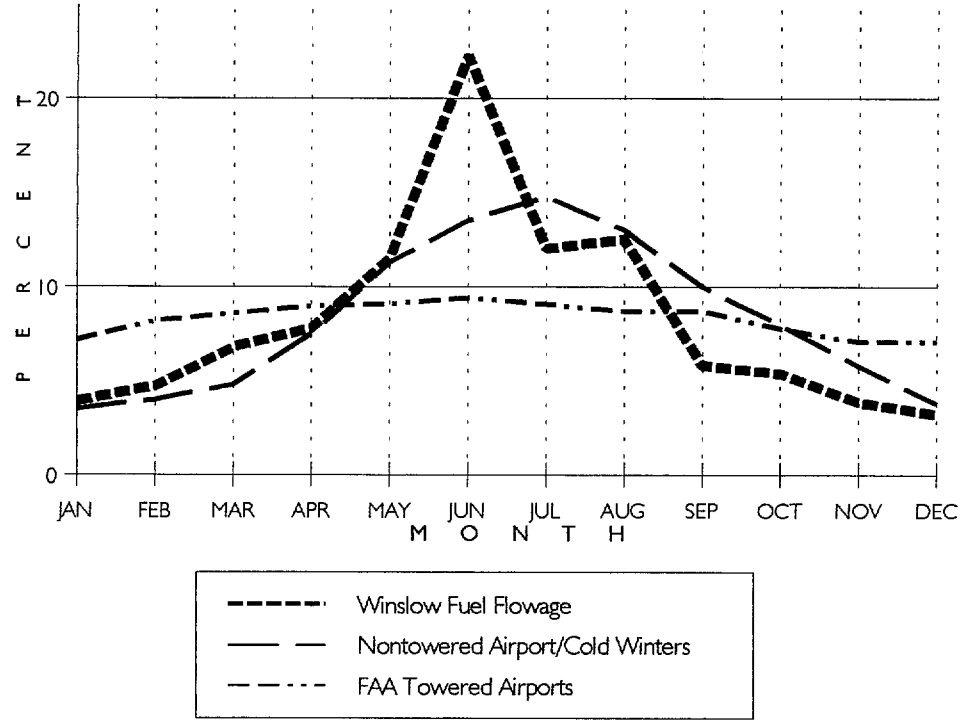
The remainder of the curve fits well with the average curve for non-towered airports with colder winter weather. This curve will be used to represent general aviation activity exclusive of U.S.F.S. use in the airport demand and facility requirements computations which follow.

FUEL SALES BY TOTAL GALLONS - WINSLOW-LINDBERGH REGIONAL AIRPORT
Calendar Years 1992 through 1996

Month	Type	1992	1993	1994	1995	1996	Total/type	Total/all	%
JAN	100LL	4,238	4,984	5,797	3,899	2,661	21,579		
	Jet A	3,433	9,645	2,193	1,609	1,743	18,623	40,202	3.94
FEB	100LL	3,550	3,885	3,491	4,960	3,847	19,733		
	Jet A	5,238	3,469	8,248	6,981	4,503	28,439	48,172	4.72
MAR	100LL	4,913	5,913	6,990	7,318	3,832	28,966		
	Jet A	10,466	9,653	8,393	11,027	1,170	40,709	69,675	6.83
APR	100LL	5,304	6,580	4,586	6,024	27,317	49,811		
	Jet A	2,718	11,144	3,572	8,044	4,211	29,689	79,500	7.79
MAY	100LL	6,216	9,690	13,853	7,619	41,000	78,378		
	Jet A	2,226	8,491	12,742	3,258	12,093	38,810	117,188	11.49
JUN	100LL	11,926	21,762	34,227	17,329	74,287	159,531		
	Jet A	10,016	8,474	19,408	18,380	11,723	68,001	227,532	22.31
JUL	100LL	12,869	17,785	22,121	25,510	7,343	85,628		
	Jet A	7,993	1,563	9,463	13,974	4,289	37,282	122,910	12.05
AUG	100LL	8,467	16,391	10,535	15,934	3,650	54,977		
	Jet A	20,228	30,368	6,555	13,548	2,229	72,928	127,905	12.54
SEP	100LL	6,914	7,467	6,301	8,600	5,548	34,830		
	Jet A	4,794	5,137	6,052	3,683	5,066	24,732	59,562	5.84
OCT	100LL	6,704	5,091	9,275	6,191	3,973	31,234		
	Jet A	5,792	4,616	11,320	1,377	884	23,989	55,223	5.41
NOV	100LL	3,557	6,374	3,067	4,105	3,370	20,473		
	Jet A	3,353	5,944	5,256	1,780	2,546	18,879	39,352	3.86
DEC	100LL	2,167	5,289	4,484	3,594	3,997	19,531		
	Jet A	1,133	2,206	6,178	2,105	1,655	13,277	32,808	3.22
TOTALS	100LL	76,825	111,211	124,727	111,083	180,825	604,671		
	Jet A	77,390	100,710	99,380	85,766	52,112	415,358	1,020,029	
	ALL	154,215	211,921	224,107	196,849	232,937	1,020,029		

SEASONAL USE CURVE

Based on Records of Fuel Sales Calendar Years 1992 through 1996



MONTH	Nontowered w/Colder Winter Weather	FAA Towered Airports	Winslow Fuel Sales
January	3.5%	7.2%	3.94%
February	4.0%	8.2%	4.72%
March	4.8%	8.6%	6.83%
April	7.5%	9.0%	7.79%
May	11.3%	9.1%	11.49%
June	13.5%	9.4%	22.31%
July	14.8%	9.1%	12.05%
August	13.0%	8.7%	12.54%
September	10.0%	8.7%	5.84%
October	8.0%	7.8%	5.41%
November	5.8%	7.1%	3.86%
December	3.8%	7.1%	3.22%

The seasonal use by the U.S. Forest Service is evident in the June operational peak (22.31% of total operations).

ESTIMATED CURRENT ACTIVITY AT WINSLOW

In order to ensure a reasonably valid baseline for the aviation forecasts and recommendations for future airport improvements, two estimates of existing activity have been prepared.

The first is a depiction of the Actual Current Activity, based on short-term observations of traffic undertaken during the inventory phase of this study. The second is an estimate of the Potential 1997 Activity at the present time, which assumes that the Winslow-Lindbergh Regional Airport has the potential to operate at the level of an average U.S. general aviation airfield with good business potential and a sound local economy.

Short-Term Traffic Observations at Winslow

Observations of aircraft arrivals and departures were made during the field inventories and surveys, conducted on July 9th, 10th 11th and 17th, 1997 (see Section 1). During the observation periods, the weather was clear to partly cloudy, with VFR ceilings, unrestricted visibility and variable winds. Temperatures ranged from 70's in the morning hours to the 90's in the afternoon.

On July 9th, the traffic observations were conducted from 8:30am until 5:30pm, and twenty (20) operations were observed. Two of these were by business jets, a departure by a Cessna Citation and an arrival by a Learjet. Five operations were by multi-engined propeller aircraft. A based DC-6, operated by the U.S. Forest Service departed on a maintenance flight. Four rotorcraft operations were observed, including an arrival and departure of a DPS helicopter. Four of the eight observed single-engine operations were by a scheduled daily bank courier aircraft.

On July 10th, the traffic observations were conducted from 7:25am until 11:00am, and eighteen (18) total operations were observed. These included one operation by a Learjet. The remaining movements were by single-engine propeller aircraft.

On July 11th, the traffic observations were conducted from 6:00am until noon, and ten (10) total operations were observed. These included two operations by twin-engine propeller types and eight by single-engine propeller aircraft.

On July 17th, observations were made from 6:30am until 1:30pm. Nine (9) aircraft operations were recorded, including five by single-engine propeller aircraft and four by U.S.F.S. aircraft.

Because of the highly seasonal nature of the U.S.F.S. operations, its observed activity has been excluded from the general aviation uses. A separate estimate of U.S.F.S. activity is presented below.

Estimated Mix of General Aviation Aircraft Currently Using Winslow-Lindbergh Regional Airport

The 56 general aviation operations observed during the 4-day traffic observation period were broken down by type as follows:

Single-Engine Propeller	41	73.2%
Multi-Engine Propeller	8	14.3%
Jet	3	5.4%
Helicopter	4	7.1%

Estimated General Aviation Activity for 1997 Based on Short-Term Observations

Using the short-term traffic observations, along with the Seasonal Use Curve from the fuel sales records as presented above, the total annual operations for 1997 were estimated to be about 12,743. The following assumptions were made in this estimate:

- An average of 22 general aviation operations per day were "observed" during the three day period of study, between the hours of 7:00am and 5:59pm (11 hours of observation plus the scheduled daily courier flight).

- An additional projection of 10% of the total average daily observed operations was added to account for operations during early morning hours (6:00am to 6:59am):

$$(22 \times 0.10) \approx 2$$

- An additional projection of 15% of the total average daily observed operations was added to account for operations during evening hours (6:00pm to 7:59pm):

$$(22 \times 0.15) \approx 3$$

- An additional projection of 20% of the total average daily observed operations was added to account for night operations (8:00pm to 5:59am):

$$(22 \times 0.20) \approx 4$$

- Average daily operations over the year will equal the total average daily observed movements plus the projected movements for night, early morning and evening hours times 2 (each arrival will ultimately result in a departure, and each departure will ultimately result in an arrival):

$$(22 + 2 + 3 + 4) \times 2 = 62$$

- Monthly operations for July will equal the average daily operations times 30.42 days:

$$(62 \times 30.42) = 1{,}886$$

- The estimated annual operations are equal to the average monthly operations for July divided by the seasonal use percentage from the Seasonal Use (cold winters/non-towered airports) Curve:

$$(1{,}886 \div 14.8\%) = \mathbf{12{,}743}$$

The chart on the following page is a tabulation of the observed general aviation operations and the estimates of activity as explained above. In the chart, the shaded cells indicate traffic which was actually observed. Unshaded cells are projections.

Average GA Operations per Based Aircraft: Multiple Airport User Surveys

In the process of preparing numerous airport master plans for U.S. general aviation airports, an extensive database of information regarding aircraft operations has been accumulated. Over the years, airport user survey questionnaires have been distributed to aircraft owners who base their aircraft at 21 different airports. These questionnaires made inquiry as to the number of total operations performed by each aircraft and give a good indication of the probable level of use of private general aviation aircraft.

In the surveys, it was found that airports with a very high level of training operations, such as Buffalo, Minnesota and Rexburg, Idaho, have the highest use per based aircraft. The same is true of airports in communities with heavily tourism-based economies, such as Brainerd and Cloquet, Minnesota.

The results of the surveys, in terms of total annual operations by based aircraft, are summarized below.

Airport User Surveys 1988-1996 - Annual Based Aircraft Operations

AIRPORT	YEAR	Ops	AIRPORT	YEAR	Ops
Sawyer County (WI)	1988	208	Thief River Falls Regional (MN)	1992	194
Buffalo Municipal (MN)	1989	481	Brainerd-Crow Wing Cty (MN)	1990	566
Mora Municipal (MN)	1989	232	Cambridge Municipal (MN)	1993	115
Two Harbors Municipal (MN)	1989	275	Cloquet Municipal (MN)	1993	410
Rusk County (WI)	1989	97	Red Wing Municipal (MN)	1994	128
Chippewa Valley Regional (WI)	1990	217	Rexburg -Madison County (ID)	1994	427
Cumberland Municipal (WI)	1990	220	Pershing County (NV)	1993	205
Canby Municipal (MN)	1991	118	Douglas Municipal (AZ)	1994	138
Glencoe Municipal Airport (MN)	1991	119	Baudette International (MN)	1994	64
Portage Municipal (WI)	1992	360	Bisbee-Douglas Intl (AZ)	1996	30
Rush City Municipal (MN)	1992	116			
			AVERAGE		**225**

SHORT TERM GENERAL AVIATION TRAFFIC OBSERVATIONS
Winslow-Lindbergh Regional Airport - July 9, 10, 11 & 17, 1997

TIME	7/9	7/10	7/11	7/17	Total	Average
7:00a - 7:59a	0	1	1	0	2	1
8:00a - 8:59a	3	7	6	5	21	5
9:00a - 9:59a	0	8	0	0	8	2
10:00a - 10:59a	2	2	1	0	5	1
11:00a - 11:59a	1	1	2	0	4	1
12:00p - 12:59p	0	0	0	0	0	0
1:00p - 1:59p	5	5	5	0	15	4
2:00p - 2:59p	3	3	3	3	12	3
3:00p - 3:59p	3	3	3	3	12	3
4:00p - 4:59p	0	0	0	0	0	0
5:00p - 5:59p	2	2	2	2	8	2
Total Observed Movements	**19**	**32**	**23**	**13**	**87**	**22**
6:00a - 6:59a	10% of 11-hour observed operations					2
6:00p - 7:59p	15% of 11-hour observed operations					3
8:00p - 5:59a	20% of 11-hour observed operations					4
Total Projected Movements						**9**
Daily Movements	Total Observed + Projected Movements					**31**
Daily Operations	Daily Movements X 2					**62**
July 1997 Estimated Operations	Daily Operations X 30.42 (equals 14.8% of annual activity)					**1,886**
ANNUAL OPERATIONS	July Operations ÷ 14.8%					**12,743**

Current U.S. Forest Service Operations at Winslow

The 1987 Master Plan Report for Winslow Municipal Airport indicates that the U.S. Forest Service conducted 302 operations at Winslow in 1986, and projected that this level of use would remain constant throughout the 1987-2006 planning period.

The following number of operations were conducted by the U.S.F.S. between 1987 and the 1997 fire season. The Forest Service records include only actual fire retardant sorties, with fully-loaded aircraft departing. Proficiency, maintenance and ferry operations account for another 10-20 operations per year.

U.S. Forest Service Operations
Winslow-Lindbergh Regional Airport 1987 - 1997

Year	**Sorties**	**Operations** *(Sorties X 2)*	**Total Operations** *(including proficiency, maintenance & ferry flights)*
1987	96	192	212
1988	62	124	144
1989	244	488	508
1990	311	622	642
1991	48	96	116
1992	16	32	52
1993	102	204	224
1994	83	166	186
1995	97	194	214
1996	334	668	688
1997	24	48	68
Average Annual Operations			**278**

Source: U.S. Forest Service - Winslow, AZ

The Forest Service uses nine different aircraft for fire retardant application missions from their Winslow base. These are all leased to the U.S.F.S. by private companies on a three-year contract (bid) basis, and include the following aircraft:

Consolidated PB4Y-2	Lockheed P3-A
Lockheed P2V-5/7	Douglas DC-6A
Lockheed C130 A/E	Douglas DC-7B
Lockheed SP2-H	Douglas DC-7C
Douglas DC-4	

The listed aircraft are present at Winslow on an as-needed basis. The aircraft operators will be phasing out the radial-engined types listed above in favor of turbine powered aircraft over the next 5 to 10 years. Only the Lockheed P3 and C130 are turbine powered.

Estimated Actual Current Activity at Winslow in 1997

There are currently 10 general aviation aircraft based at Winslow, including 8 single-engine and 2 multi-engine fixed wing types, according to the ADOT Aircraft Registration Records.

The Actual Current Activity at Winslow was approximated based on the above criteria, applied as follows:

- The total annual general aviation operations was assumed to be reflected in the projection of the short-term traffic observations, as presented in the table above (12,743).
- The number of *annual operations by based GA aircraft* was calculated by multiplying the average number of operations by based aircraft from the user surveys (225) by each type of based aircraft currently at Winslow.
- The mix of transient GA aircraft was assumed to be represented by the mix of types observed during the short-term traffic count.
- The number of actual 1997 fire season operations (68) was added to the totals as activity by based aircraft.

ESTIMATED ACTUAL CURRENT ACTIVITY
WINSLOW-LINDBERGH REGIONAL AIRPORT - 1997

Aircraft Type	Based Aircraft	Based Operations	Transient Operations	Total Operations
Estimated Total 1997 GA Operations				**12,743**
Single-Engine Propeller	8	1,800	7,528	9,328
Multi-Engine Propeller	2	450	1,372	1,822
Jet	0	0	688	688
Helicopter	0	0	905	905
Sub-Total (GA Operations)	**10**	**2,250**	**10,493**	**12,743**
U.S.F.S. Operations	*	68	0	68
TOTAL ACTIVITY	**10**	**2,318**	**10,493**	**12,811**

** Fire retardant application aircraft are based at Winslow on an as-needed basis.*

Potential 1997 Activity Estimate for Winslow

If it is assumed that rehabilitation and upgrade of the airport's infrastructure will foster some increase in the aeronautical activity at Winslow, it will follow that the estimated current activity may increase in a very short time. With an aggressive marketing focus, it is not at all unlikely that the Winslow airport will become the leading general aviation facility in the area. Levels of activity could quickly reach the national averages for a rural business- and tourism-oriented airfield.

This potential increase is assumed to occur soon after the initial runway, taxiway, apron and related infrastructure improvements are made, possibly within the next five years. The Potential 1997 Activity level is the minimum level that the initial improvements should be designed to accommodate.

The Potential 1997 Activity was estimated as follows:

- The estimated number of annual local, itinerant, and total operations were calculated by application of the empirical airport activity equations derived from 1995 research of airport activity within 24 Metropolitan Service Areas in the FAA Great Lakes Region (A Method of Estimating Annual Aircraft Operations at Non-towered Airfields, Nicholas J. Pela & Associates - June, 1995).

  The equations are as follows:

  x = Number of Based Aircraft

  y_t = Total Annual Operations
  y_l = Annual Local Operations
  y_i = Annual Itinerant Operations

  $y_t = 13{,}321 + 515x - 0.053x^2$
  $y_l = 4{,}933 + 268x - 0.039x^2$
  $y_i = 8{,}388 + 247x - 0.014x^2$

- The User Survey activity estimate average for 21 U.S. general aviation airports was used to indicate the current average number of *annual based operations per resident aircraft* (225).

- The average number of *transient operations per based aircraft* was calculated as the difference between the total operations per based aircraft and the average annual based operations per resident aircraft. Thus, *total transient operations* were computed as:

  Total Annual Operations - 225(Total Based Aircraft)

- The mix of various types of transient aircraft was based on the FAA's 1994 records of hours flown by the U.S. aircraft fleet, differentiated by type as follows:

Fixed-Wing Piston	18,700,000 hrs	81.3%
Jet and Turboprop	2,400,000 hrs	10.5%
Piston Rotorcraft	400,000 hrs	1.7%
Turbine Rotorcraft	1,500,000 hrs	6.5%

- U.S. Forest Service operations are represented as the 10-year average of actual annual operations (278), included as activity by based aircraft.

The Potential 1997 Activity has been estimated as follows, based on the above criteria.

POTENTIAL 1997 ACTIVITY
WINSLOW-LINDBERGH REGIONAL AIRPORT

Total Based Aircraft	**10**
TOTAL ANNUAL OPERATIONS	**18,466**
Annual Local Operations	7,609
Annual Itinerant Operations	10,857

Type of Aircraft Operation	Based	Transient	TOTAL
Fixed-Wing Piston	4,725	11,171	15,896
Jet and Turboprop	0	1,443	1,443
Piston Rotorcraft	0	234	234
Turbine Rotorcraft	0	893	893
Sub-Total (GA Operations)	**4,725**	**13,741**	**18,466**
U.S.F.S. Operations	278	0	**278**
TOTAL ACTIVITY	**5,003**	**13,741**	**18,744**

Demographics and Aviation Growth Indicators

As part of the data collection and research for this master planning project, records of National, state and county demographics and aviation growth indicators were collected. These are listed for reference in the Summary of Historical Data on the following page. Record data for population, per capita income, numbers of registered aircraft, as well as fuel sales at the airport (as presented above), were collected from various sources, as referenced in the summary tabulation.

In the 1970's and through most of the 1980's wide use of linear regression models was employed as an effective aviation forecasting tool. These models worked well because aviation was exhibiting steady growth along with most other demographic and economic indicators.

In the mid-1980's, however, the aviation industry began to change. The steady growth which began in the 1940's and 1950's suddenly slowed and then began to decline as aircraft manufacturers stopped production of most light aircraft. This initial decline was in response to a recession economy, but the aviation industry did not recover when the economy improved.

Manufacturers were hesitant to produce light aircraft because of increased liability exposure, which was made evident after several successful lawsuits were brought against them. These multi-million dollar lawsuits involved accidents which the litigants claimed resulted from design flaws in the involved aircraft. The aircraft involved were models which had, in some cases, been in production for 30 or more years. The judgements claimed that the manufacturer was responsible for the perceived safety of their product even after this length of time.

The recently passed liability reform legislation has provided the aviation industry with some relief from the burden of increasing liability exposure. In response to this, Cessna Aircraft has resumed production of its 172, 182 and 206 models. Piper Aircraft is also producing several models in its Cherokee line. It appears as though the aviation industry is at a turning point, and that a reversal of the decade-long decline may be at hand.

Although the outlook for the general aviation industry is good, the historical data can no longer be as successfully applied in the mathematical models as it was in the past.

Summary of Available Historical Data - Navajo County and Winslow-Lindbergh Regional Airport

YEAR	County Population	County Per Capita Income [1]	Aviation Fuel Sales at Winslow (gallons) [5]	Arizona Registered Aircraft [3]	County Registered Aircraft [3]	County Share of State Aircraft	Winslow Based Aircraft	Winslow Share of County Aircraft
1970	48,200	$2,130						
1971	51,200	$2,388						
1972	52,400	$2,628						
1973	53,600	$2,962						
1974	56,500	$3,215						
1975	58,800	$3,688						
1976	61,000	$3,961						
1977	60,800	$4,703						
1978	63,000	$5,435						
1979	66,400	$5,565					37 [2]	
1980	67,700	$6,064						
1981	68,000	$6,316						
1982	68,700	$6,604	161,168					
1983	70,500	$6,850		6,062	108	1.78%	31 [6]	28.70%
1984	69,900	$7,550		6,000	107	1.78%		
1985	71,500	$7,830		6,159	111	1.80%	25 [6]	22.52%
1986	74,000	$8,225		6,162	114	1.85%		
1987	75,200	$8,549		6,272	92	1.47%	21 [2]	22.83%
1988	76,300	$8,661		6,194	81	1.31%		
1989	77,400	$8,981		6,354	85	1.34%		
1990	77,966 [9]	$9,496		6,307	88	1.40%		
1991	78,884 [9]	$9,797		6,317	106	1.68%		
1992	80,681 [9]	$10,565	154,215	5,230	72	1.38%		
1993	84,143 [9]	$10,601	211,921	4,965	72	1.45%		
1994	86,101 [9]	$11,130	224,107					
1995	89,354 [9]		196,849				15 [8]	
1996	92,086 [9]		232,937					

1 Source: U.S. Department of Commerce - Bureau of Economic Analysis (unless noted otherwise).

2 Source: Winslow Airport Master Plans - 1979 and 1987.

3 Source: FAA Census of Civil Aircraft, 1970-1989 (unless otherwise noted).

4 Source: Arizona DOT/ Aeronautics Division Records (registered).

5 Source: Winslow Airport Manager.

6 Source: Arizona Airports Activity Survey 1983 and 1985 (actual).

7 Source: Arizona Department of Economic Security (unless noted otherwise).

8 Source: FAA Form 5010 (1995)

9 Source: U.S. Bureau of the Census, Population Division.

( ) Indicates questionable or approximate data.

FORECASTS OF AVIATION ACTIVITY 1997-2017

The selected forecasting methodology, ADM v7.02 (Airport Demand Model), considers the relationship between aviation activity, population and a selected economic indicator. The assumption is made that, with a constant economy, general aviation activity will vary directly with population. In theory, when the economy improves a larger percentage of income is available to be used for acquisition of aircraft and for aviation-related activities.

The figure which represents the difference between economic growth and corresponding demand in a particular industry is called the demand elasticity index. In theory, if an airport is realizing its potential in terms of utilization by its service area, a computed elasticity index will approximate the national average.

The ADM program analyzes historic data for a selected period and computes average growth indices for population and the economic indicator, and a representative elasticity index. The number of based aircraft is then multiplied by the growth indices and the elasticity index for each successive year.

In order to provide a sound basis for future planning of airport improvements, two forecasts were prepared for the twenty-year planning period under study. These are the *Low-Range Forecast*, which assumes modest growth in aviation activity at Winslow, and the *High-Range Forecast*, which assumes that activity will quickly reach a level representative of national average trends for similar facilities.

Both forecasts rely on a comparison of historical data from the 1982 and 1994 sample years. The data common to the two forecasts is as follows:

- Growth in aviation activity in Winslow was modeled by referring to records of the total number of gallons of aviation fuel sold at the airport. An average increase of +2.79% per year was realized between the sample years.
- The county's population increased at an average rate of +1.90% per year throughout the 1982-1994 sample period.
- County per capita income was used as a general indicator of economic growth in the Winslow area. Between 1982 and 1994, per capita income increased at an average rate of +4.45% per year.

The comparison of the above data yields an aviation demand elasticity index of +0.6153.

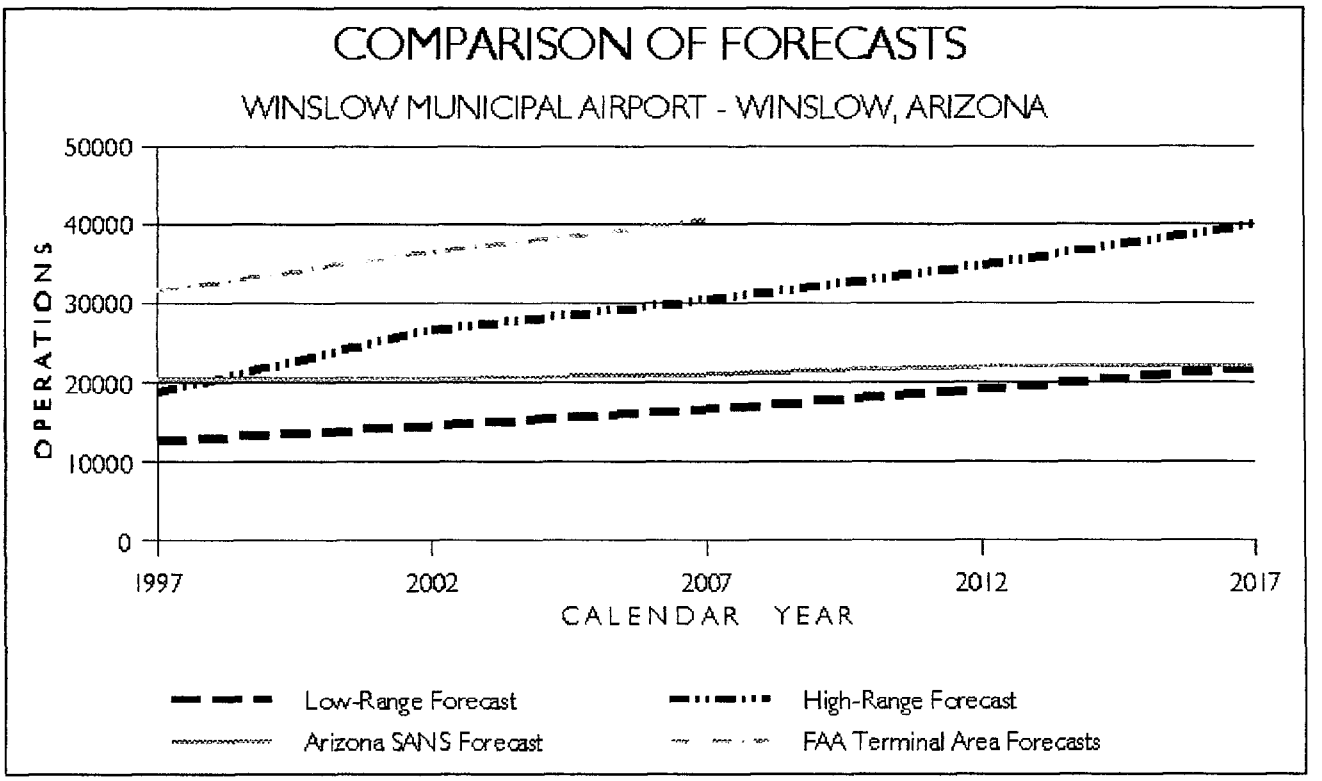
Low-Range Forecast

The Low-Range Forecast begins with the Estimated Actual Aviation Activity for 1997, as presented on Page 2-15. Projections were made by applying the above criteria to the twenty-year planning period. It was assumed that future based aircraft will be limited to the types currently based at Winslow (single- and multi-engine piston types).

High-Range Forecast

The High-Range Forecast begins with the Potential 1997 Activity estimate, as presented on Page 2-17. The methodology of the projections is similar to the Low-Range Forecast, except that it was assumed that one Jet or Turboprop and one Piston Rotorcraft will be based at Winslow by the year 2001.

The Low-Range and High-Range Forecasts are tabulated on the following pages. A comparison of these projections with the 1995 Arizona State Aviation Needs Study (SANS) and FAA Terminal Area Forecasts 1993-2005 is presented below.



LOW-RANGE FORECAST OF AVIATION ACTIVITY
Winslow-Lindbergh Regional Airport 1997-2017

	1997	2002	2007	2012	2017
Single-Engine Piston Aircraft	8	9	10	12	14
Multi-Engine Piston Aircraft	2	2	3	3	3
Jet Aircraft	0	0	0	0	0
Rotorcraft	0	0	0	0	0
Total Based Aircraft	**10**	**11**	**13**	**15**	**17**
Total Transient Operations	10,493	12,088	13,836	15,837	18,127
Total Based Operations	2,318	2,575	2,948	3,374	3,862
Total Annual Operations	**12,811**	**14,663**	**16,784**	**19,211**	**21,989**
Based Operations by Type:					
Single-Engine Piston Aircraft	1,800	2,060	2,358	2,699	3,090
Multi-Engine Piston Aircraft	450	515	590	675	772
Jet Aircraft	0	0	0	0	0
Rotorcraft	0	0	0	0	0
U.S.F.S. Operations	68	78	89	102	117
Transient Operations by Type:					
Single-Engine Piston Aircraft	7,528	8,793	10,064	11,520	13,185
Multi-Engine Piston Aircraft	1,372	1,717	1,965	2,249	2,575
Jet Aircraft	688	644	737	843	964
Rotorcraft	905	857	981	1,123	1,286
Total Annual Operations	**12,811**	**14,664**	**16,784**	**19,211**	**21,989**

HIGH-RANGE FORECAST OF AVIATION ACTIVITY
Winslow-Lindbergh Regional Airport 1997-2017

	1997	2002	2007	2012	2017
Fixed-Wing Piston Aircraft	10	14	15	18	20
Jet or Turboprop Aircraft	0	1	2	2	2
Piston Rotorcraft	0	1	2	2	2
Turbine Rotorcraft	0	0	0	0	0
Total Based Aircraft	**10**	**16**	**19**	**22**	**24**
Total Transient Operations	13,741	18,551	21,235	24,305	27,819
Total Based Operations	5,003	8,105	9,278	10,619	12,155
Total Annual Operations	**18,744**	**26,656**	**30,513**	**34,924**	**39,974**
Based Operations by Type:					
Fixed-Wing Piston Aircraft	4,725	6,379	7,302	8,357	9,566
Jet or Turboprop Aircraft	0	675	773	885	1,013
Piston Rotorcraft	0	675	773	885	1,013
Turbine Rotorcraft	0	0	0	0	0
U.S.F.S. Operations	278	375	430	492	563
Transient Operations by Type:					
Fixed-Wing Piston Aircraft	11,171	15,082	17,263	19,759	22,616
Jet or Turboprop Aircraft	1,443	1,948	2,230	2,552	2,921
Piston Rotorcraft	234	316	362	414	474
Turbine Rotorcraft	893	1,206	1,380	1,580	1,808
Total Annual Operations	**18,744**	**26,656**	**30,513**	**34,924**	**39,974**

CRITICAL AIRCRAFT DETERMINATION

The "critical", or "design", aircraft for any given airport facility is defined as that aircraft (or group of aircraft) whose dimensional and/or performance characteristics are the basis for selection of facilities design criteria. The critical aircraft must be demonstrated to account for a minimum of 500 annual actual or forecast operations.

Different aircraft may govern the requirements for runway design, and for lateral and vertical separation standards. The factors usually considered are the aircraft maximum gross takeoff weight, approach speed category, wingspan, and tail height.

The verifiable critical aircraft currently using the Winslow-Lindbergh Regional Airport facilities is a mix of transient ARC B-I, B-II and C-I, C-II and C-III business jets, which together account for nearly 700 annual operations. The Potential 1997 Activity estimates indicate that use by this critical aircraft fleet may potentially increase to over 1,400 annual operations after initial airport improvements are made.

Operations by U.S. Forest Service aircraft include use by modified Consolidated PB4Y-2, Lockheed P-2V, Lockheed C-130, Lockheed P-3, and Douglas DC-4, DC-6 and DC-7's. This activity accounted for another 68 annual operations in FY 1997. The Potential 1997 Activity estimates indicate that U.S.F.S. use averaged 278 annual operations over the past 10 years. This use could possibly exceed the 500 annual operations threshold during the planning period. U.S.F.S. sources have indicated that all but the Lockheed P-3, an ARC C-III turbojet aircraft, will be phased out of service over the next few years.

Base year airport design criteria should, therefore, conform to at least ARC C-II category standards, with consideration for the possibility of expansion to accommodate ARC C-III critical aircraft in the future.

A representative "design fleet" of ARC B-I through C-III aircraft is presented in the tables on the following pages. The tables are output files from the AcData v6.10 aircraft database. Runway requirements for the various aircraft were computed based on a density altitude of 8,000', which was derived by using a pressure altitude of 4,937' MSL at 94° Fahrenheit.

The critical aircraft listings indicate that a 10,300' long runway would be required to accommodate all of the selected database aircraft in all listed loadings and configurations, at the 8,000' density altitude. Most of the listed types could be accommodated by the currently available runway length of 7,500'. Those not accommodated are marked with an asterisk (*).

CRITICAL AIRCRAFT DESIGN FLEET
WINSLOW-LINDBERGH REGIONAL AIRPORT
Page 1 of 4

ARC B-I

P A R A M E T E R S :
DENSITY ALTITUDE : 8000 MSL
GENERAL TYPE CODE : General
U.S CUSTOMARY UNITS : Speed in knots.....Lengths in Feet.....Weight in Pounds

Greater Than:	90.00	0.00	0.00	0.00	0.00	0.00
& Less Than:	121.00	49.00	500.00	100.00	500000.00	11000.00

Model	AppSpeed	WingSpan	AClength	TailHite	TOweight	RWindex
Beechcraft B100	111	45.90	39.90	15.40	11500	5400
Beechcraft B100	111	45.90	39.90	15.40	10000	4700
Cessna 310R	93	36.92	31.96	10.67	5500	6034
Falcon 10	104	42.90	45.50	15.10	14000	3650
Falcon 10	104	42.90	45.50	15.10	16000	4300
Falcon 10	104	42.90	45.50	15.10	18740	6100
Learjet 28/29	120	43.75	47.58	12.25	15000	4750
Learjet 28/29	120	43.75	47.58	12.25	13000	4000
Metro III	112	46.20	59.40	16.70	12500	4500
Metro III	112	46.20	59.40	16.70	16000	6600
Metro II SA226-TC	112	46.25	59.42	16.67	12500	4650
Metro II SA226-TC	112	46.25	59.42	16.67	10500	3050
Metro II SA226-TC	112	46.25	59.42	16.67	8500	2325
Cessna 425	103	44.10	35.90	12.60	8600	5265
Cessna 425	103	44.10	35.90	12.60	8200	5115
Cessna 340A	92	38.10	34.30	12.60	5990	4621
Cessna 340A	92	38.10	34.30	12.60	5000	3042
Cessna 402C	95	44.12	36.38	11.45	6850	5028
Cessna 402C	95	44.12	36.38	11.45	5500	3052
Cessna 414A	94	44.10	36.40	11.50	6750	5693
Cessna 414A	94	44.10	36.40	11.50	5700	3856
Cessna 421C	96	41.10	36.40	11.50	7450	4877
Cessna 421C	96	41.10	36.40	11.50	6200	3189
Sabreliner NA-265-40	120	44.50	43.80	16.00	18650	7650*
Sabreliner NA-265-60	120	44.50	48.30	16.00	20000	8725*
Cessna Citation I/SP	107	47.10	43.50	14.33	11850	4390
Cessna Citation I/SP	107	47.10	43.50	14.33	10000	3140

Source: AcData v6.10

CRITICAL AIRCRAFT DESIGN FLEET
WINSLOW-LINDBERGH REGIONAL AIRPORT
Page 2 of 4

ARC B-II

P A R A M E T E R S :
DENSITY ALTITUDE : 8000 MSL
GENERAL TYPE CODE : General
U.S CUSTOMARY UNITS : Speed in knots.....Lengths in Feet.....Weight in Pounds

Greater Than:	90.00	48.99	0.00	0.00	0.00	0.00
& Less Than:	121.00	79.00	500.00	100.00	500000.00	11000.00

Model	AppSpeed	WingSpan	ACLength	TailHite	TOweight	RWindex
Beechcraft B200	98	54.50	43.80	15.00	12500	4500
Beechcraft B200	98	54.50	43.80	15.00	11000	4200
Falcon 20	107	53.50	56.30	17.40	18000	3600
Falcon 20	107	53.50	56.30	17.40	26000	7200
Falcon 200	114	53.50	56.30	17.40	20000	3750
Falcon 200	114	53.50	56.30	17.40	26000	4700
Falcon 50	113	61.90	60.80	22.90	22000	3500
Falcon 50	113	61.90	60.80	22.90	30000	4200
Falcon 50	113	61.90	60.80	22.90	37480	6600
Falcon 900	100	63.40	66.30	24.80	45500	7350
Falcon 900	100	63.40	66.30	24.80	34000	4200
Falcon 900	100	63.40	66.30	24.80	28000	3325
Gulfstream I	113	78.30	75.30	23.00	34000	6900
Merlin IVC	113	57.00	59.33	16.67	12500	4500
Merlin IVC	113	57.00	59.33	16.67	16000	6300
Saab 340B	104	70.33	64.67	22.50	30000	7825*
Saab 340B	104	70.33	64.67	22.50	25000	4850
Saab-Fairchild SF 340A	104	70.33	64.67	22.50	28000	7250
Saab-Fairchild SF 340A	104	70.33	64.67	22.50	25000	5450
Westwind Astra	110	52.67	55.58	18.17	24650	9000*
Westwind Astra	110	52.67	55.58	18.17	23000	7000
Westwind Astra	110	52.67	55.58	18.17	20000	5450
Embraer EMB-120 Brasilia	108	64.90	65.60	20.80	25353	7025
Embraer EMB-120 Brasilia	108	64.90	65.60	20.80	24000	6000
Cessna 441	99	49.30	34.70	12.80	9850	5084
Cessna 441	99	49.30	34.70	12.80	7800	4447
Sabreliner NA-265-65	105	50.50	46.10	16.00	19000	6650

Source: AcData v6.10

CRITICAL AIRCRAFT DESIGN FLEET
WINSLOW-LINDBERGH REGIONAL AIRPORT
Page 3 of 4

ARC B-III

P A R A M E T E R S :
DENSITY ALTITUDE : 8000 MSL
GENERAL TYPE CODE : General
U.S CUSTOMARY UNITS : Speed in knots.....Lengths in Feet.....Weight in Pounds

Greater Than:	90.00	78.99	0.00	0.00	0.00	0.00
& Less Than:	121.00	118.00	500.00	100.00	500000.00	11000.00

Model	AppSpeed	WingSpan	AClength	TailHite	TOweight	RWindex
DHC-8-100	94	85.00	73.00	25.00	34400	5250
DHC-8-100	94	85.00	73.00	25.00	30000	3300

ARC C-I

P A R A M E T E R S :
DENSITY ALTITUDE : 8000 MSL
GENERAL TYPE CODE : General
U.S CUSTOMARY UNITS : Speed in knots.....Lengths in Feet.....Weight in Pounds

Greater Than:	120.00	0.00	0.00	0.00	0.00	0.00
& Less Than:	141.00	49.00	500.00	100.00	500000.00	11000.00

Model	AppSpeed	WingSpan	AClength	TailHite	TOweight	RWindex
Learjet 23	128	35.58	43.17	12.00	12000	7500
Learjet 23	128	35.58	43.17	12.00	10500	5000
Learjet 24B	128	35.58	43.25	12.58	13500	5150
Learjet 24B	128	35.58	43.25	12.58	12000	4150
Learjet 25B/C	137	35.58	47.50	12.50	15000	7000
Learjet 25B/C	137	35.58	47.50	12.50	12000	4050
Learjet 25D/F	137	35.58	47.58	12.25	15000	7000
Learjet 25D/F	137	35.58	47.58	12.25	12000	4200
Learjet 31	129	39.50	48.70	12.30	10000	4060
Learjet 31	129	39.50	48.70	12.30	14000	4690
Learjet 31	129	39.50	48.70	12.30	16500	6400
Learjet 55C	128	43.75	55.08	14.67	21500	8480*
Learjet 55C	128	43.75	55.08	14.67	17000	5140
IAI Westwind 1124	129	44.80	52.30	15.80	21000	5950
IAI Westwind 1124	129	44.80	52.30	15.80	18000	4300
IAI Westwind 1124A	129	44.80	52.30	14.80	23500	8000*
IAI Westwind 1124A	129	44.80	52.30	14.80	21000	5800
IAI Westwind 1124A	129	44.80	52.30	14.80	18000	4400

Source: AcData v6.10

CRITICAL AIRCRAFT DESIGN FLEET
WINSLOW-LINDBERGH REGIONAL AIRPORT
Page 4 of 4

ARC C-II

```
P A R A M E T E R S :
DENSITY ALTITUDE     : 8000 MSL
GENERAL TYPE CODE    : General
U.S CUSTOMARY UNITS :  Speed in knots.....Lengths in Feet.....Weight in Pounds

   Greater Than:      120.00     48.99      0.00      0.00      0.00      0.00
   &  Less Than:      141.00     79.00    500.00    100.00 500000.00  11000.00
```

Model	AppSpeed	WingSpan	ACLength	TailHite	TOweight	RWindex
Gulfstream III	136	77.80	83.10	24.40	69700	8200*
Gulfstream III	136	77.80	83.10	24.40	58000	5750
Gulfstream III	136	77.80	83.10	24.40	50000	4400
Lockheed Jetstar	132	54.42	60.42	20.42	34000	7050
Lockheed Jetstar II	132	54.42	60.42	20.42	44500	5000
Lockheed Jetstar II	132	54.42	60.42	20.42	36000	4800
Sabreliner NA-265-80	128	50.40	47.20	17.30	19000	6900
Sabreliner NA-265-80A/SC	128	50.40	47.20	17.30	25500	8600*
Sabreliner NA-265-80A/SC	128	50.40	47.20	17.30	20000	5150

ARC C-III

```
P A R A M E T E R S :
DENSITY ALTITUDE     : 8000 MSL
GENERAL TYPE CODE    : General
U.S CUSTOMARY UNITS :  Speed in knots.....Lengths in Feet.....Weight in Pounds

   Greater Than:      120.00     78.99      0.00      0.00      0.00      0.00
   &  Less Than:      141.00    118.00    500.00    100.00 500000.00  11000.00
```

Model	AppSpeed	WingSpan	ACLength	TailHite	TOweight	RWindex
Boeing 727-100 JT8D-7	125	108.00	133.17	34.25	140000	8950*
Boeing 727-100 JT8D-7	125	108.00	133.17	34.25	130000	7625*
Boeing 727-200 JT8D-7	138	108.00	153.17	34.92	140000	8775*
Boeing 737-200 JT8D-9	137	93.00	100.17	37.25	94000	9000*
Boeing 737-200 JT8D-17R	137	93.00	100.17	37.25	110000	10300*
DC-9-11 JT8D-1	134	89.40	104.40	27.60	77750	7250
DC-9-12 JT8D-1	134	89.40	104.40	27.60	79500	8350*
DC-9-13 JT8D-1	134	89.40	104.40	27.60	83750	9400*
DC-9-14 JT8D-1	134	89.40	104.40	27.60	85750	9950*
Lockheed L-188 Electra	123	99.00	104.58	33.67	95000	5400

Source: AcData v6.10

AIRPORT CAPACITY CALCULATIONS

The methodology for computing the relationship between an airport's demand versus its capacity is contained in FAA Advisory Circular AC 150/5060-5, Airport Capacity and Delay.

In order to facilitate this comparison, computations were made to determine the hourly capacity of the existing airport in Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions.

The Annual Service Volume (ASV) of the airport in its ultimate development condition was also determined.

The above determinations were made using the assumptions recommended in the Advisory Circular for the particular airport layout and conditions, combined with the forecast operational data generated with this study. In the following table is a tabulation of the physical aspects of the four aircraft classes (not to be confused with the aircraft approach categories discussed in Section 3), as considered in this Section.

FAA AIRCRAFT CLASSIFICATIONS FOR CAPACITY CONSIDERATIONS

CLASS	Maximum Takeoff Weight	ENGINES
A	12,500 lbs. or less	Single
B	12,500 lbs. or less	MultiEngine
C	12,500 to 300,000 lbs.	MultiEngine
D	over 300,000 lbs.	MultiEngine

Source: AC 150/5060-5, Airport Capacity and Delay.

Runway Capacity - Existing and Ultimate Conditions

The Winslow-Lindbergh Regional Airport, in its existing configuration, is served by a nonprecision instrument approach and is primarily used by Class A and B aircraft, with about 10% use by Class C aircraft and no use by Class D types.

No airspace limitations which would effect runway use have been identified. In all calculations, it is assumed that arrivals equal departures, and that "touch and go" activity accounts for less than 10% of the total operations.

The existing airport consists of a 7,102' long main runway (11-29) and a 7,498' long crosswind runway (4-22), in a crossing configuration.

For the purposes of this study, it was assumed that the airport will remain a two-

runway system with a crossing configuration, with full parallel taxiways and that an instrument approach to visibility minimums of less than ¾ mile will be installed (an ILS, DGPS or TLS approach).

Using the above criteria and applying them to the Hourly Capacity charts in the Advisory Circular, it is seen that the approximate average peak capacities for the airport in its existing and assumed ultimate configurations, in Instrument Flight Rules (IFR) conditions are 22 and 59 operations per hour, respectively.

AIRPORT HOURLY DEMAND CALCULATIONS

In order to arrive at a reasonable estimate of the actual demand upon the airport facilities, it was necessary to develop a method to calculate the estimated Maximum Peak Hourly Demand which might be expected to occur during the hours of peak usage of the airport. The Seasonal Use Trend Curve, as presented above, was used as a tool to determine this usage.

Using the Seasonal Use information, a formula was derived which will calculate the average daily operations in a given month, based on the percentage of the total annual operations for that month, as determined by the curve.

The formula is as follows:

Where T = Monthly percent of use (from curve).
M = Average monthly operations.
A = Total annual operations.
D = Average Daily Operations in a given month.
M = A (T / 100)
D = M / (365 / 12)

Experience has shown that approximately 90% of total daily operations will occur between the hours of 7:00 AM and 7:00 PM (12 hours) at a typical General Aviation airport such as Winslow, and that the maximum peak hourly occurrence may be 50% greater than the average of the hourly operations calculated for this time period.

Therefore, the *Estimated Peak Hourly Demand* (P) in a given month was determined by compressing 90% of the Average Daily Operations (D) in a given month into the 12 hour peak use period, reducing that number to an hourly average for the peak use period, and increasing the result by 50%, as follows:

Where D = Average Daily Operations in a given month.
P = Peak Hourly Demand in a given month.
P = 1.5 (0.90D / 12)

The calculations were made for each month assuming both the existing (base) 1997 and the forecast 2017 operation levels, as determined above. Both the Low-Range and High-Range projections have been modeled to provide a range of potential demand. The U.S. Forest Service operations have been excluded from the computations.

The results are as follows:

Estimated Hourly Demand / Month
Estimated Actual Activity - 1997 (Low-Range)

Planning Year:	**1997**
Operations:	**12,743**

Month	**% USE**	**Monthly**	**Daily**	**Hourly**
January	7.20	917	30	3
February	8.20	1,045	34	4
March	8.60	1,096	36	4
April	9.00	1,147	38	4
May	9.10	1,160	38	4
June	**9.40**	**1,198**	**39**	**4**
July	9.10	1,160	38	4
August	8.70	1,109	36	4
September	8.70	1,109	36	4
October	7.80	994	33	4
November	7.10	905	30	3
December	7.10	905	30	3

Estimated Hourly Demand / Month
Potential 1997 Activity (High-Range)

Planning Year:	1997
Operations:	18,466

Month	% USE	Monthly	Daily	Hourly
January	7.20	1,330	44	5
February	8.20	1,514	50	6
March	8.60	1,588	52	6
April	9.00	1,662	55	6
May	9.10	1,680	55	6
June	**9.40**	**1,736**	**57**	**6**
July	9.10	1,680	55	6
August	8.70	1,607	53	6
September	8.70	1,607	53	6
October	7.80	1,440	47	5
November	7.10	1,311	43	5
December	7.10	1,311	43	5

Estimated Hourly Demand / Month
Forecast 2017 Activity (Low-Range)

Planning Year:	2017
Operations:	21,872

Month	% USE	Monthly	Daily	Hourly
January	7.20	1,575	52	6
February	8.20	1,794	59	7
March	8.60	1,881	62	7
April	9.00	1,968	65	7
May	9.10	1,990	65	7
June	**9.40**	**2,056**	**68**	**8**
July	9.10	1,990	65	7
August	8.70	1,903	63	7
September	8.70	1,903	63	7
October	7.80	1,706	56	6
November	7.10	1,553	51	6
December	7.10	1,553	51	6

Estimated Hourly Demand / Month
Forecast 2017 Activity (High-Range)

Planning Year:	2017
Operations:	39,411

Month	% USE	Monthly	Daily	Hourly
January	7.20	2,838	93	10
February	8.20	3,232	106	12
March	8.60	3,389	111	12
April	9.00	3,547	117	13
May	9.10	3,586	118	13
June	**9.40**	**3,705**	**122**	**14**
July	9.10	3,586	118	13
August	8.70	3,429	113	13
September	8.70	3,429	113	13
October	7.80	3,074	101	11
November	7.10	2,798	92	10
December	7.10	2,798	92	10

As is evident in the tables above, the Maximum Peak Hourly Demand in the existing scenarios occurs in June, with a potential range of 4 to 6 operations per hour.

In the ultimate (2017) development time frame scenarios, the hourly peak also occurs in June, with a potential range of 8 to 14 operations per hour.

It is important to note that this estimated demand will only occur during VFR weather conditions.

ANNUAL SERVICE VOLUME (ASV)

The Annual Service Volume, or ASV, is a calculated reasonable estimate of an airport's total annual capacity, taking into account differences in runway utilization, weather conditions and aircraft mix that would be encountered in a year's time.

When compared to the forecast or existing operations of an airport, the ASV will give an indication of the adequacy of a facility in relationship to its activity level.

The ASV is determined by reference to the charts contained in FAA Advisory Circular AC 150/5060-5 Airport Capacity and Delay.

The approximate Annual Service Volume for the Winslow-Lindbergh Regional Airport in its ultimate condition is 230,000 operations/year. It is, therefore, evident that the facility will not exceed its capacity within the time frame of this study, since it will theoretically be functioning at only about 17% of its ASV.

DEMAND/CAPACITY CONCLUSIONS

There are no demand or capacity constraints apparent for the Winslow-Lindbergh Regional Airport, either at the present time or in the future.

Identification of Specific Niche Markets

The following is a list of some specific "niche" markets that the Winslow-Lindbergh Regional Airport could serve in the future. Most of the service roles suggested are best provided by private enterprise. However, the City could provide financial incentives to promote development on the airport.

Significant improvements to the present airport infrastructure may be needed to effectively serve any of these suggested markets. The focus of the City should be to provide an adequate airport facility to serve any of these markets, and then to provide an aggressive marketing effort to attract new business to provide the suggested services.

In the listings below, the facilities that are currently adequately provided for are marked with an asterisk (*).

- Regional Business Aviation Center for Navajo County, providing accommodation of business jets and turboprops, with full precision instrument approach capabilities, and with comfortable "first class" service and accommodations for arriving pilots and executive passengers.

  Requirements:
  - Precision Instrument Approach.
  - * Runways able to accommodate business jets.
  - Pilot Lounge and briefing room.
  - Passenger Lounge/Waiting Area.
  - Meeting/Conference room(s).
  - Short-term hangar space.
  - * Coffee Shop.
  - Aircraft repair services.
  - * Jet fuel.
  - Rental car availability.

  Major Focus: Business/Corporate use.

  The airport would function as either a destination for new and developing businesses in the Winslow area, or a stopover point for refueling. Direct benefits would include increased fuel sales and restaurant traffic. Indirect benefits to the community include providing an attractive environment for relocating businesses.

- Winslow Airport Industrial Park, providing improved development sites for new industry and an interface between commercial truck and air freight transit. This is an expansion of the niche presented above (the "Regional Business Aviation Center" idea), which would also provide onsite industrial/commercial

development opportunities for relocating industry. The airport site is strategically placed to serve as a warehousing, manufacturing, or corporate base for emerging or expanding companies.

Requirements:
* Planned Industrial Park.
  Airport access from Industrial properties.
  Improved utilities service infrastructure.
  Improved vehicular access to industrial sites.
  Precision Instrument Approach.
* Runways able to accommodate business jets.
  Pilot Lounge and briefing room.
  Passenger Lounge/Waiting Area.
  Meeting/Conference room(s).
  Short-term hangar space.
* Coffee Shop.
  Aircraft repair services.
* Jet fuel.
  Rental car availability.

Major Focus: Business/Corporate/Industrial use.

As in the above example, the airport would function as either a destination for new and developing businesses in the Winslow area, or a stopover point for refueling. Direct benefits would include increased fuel sales and restaurant traffic. Indirect benefits to the community include providing an attractive environment for relocating businesses.

- Auxiliary General Aviation/Military Training Center, providing a nearby alternate instrument training site to Embry-Riddle (Prescott) students, Air Force and the Air National Guard. A new or relocating pilot training center campus could also be established.

Requirements:
  Precision Instrument Approach.
  Runway able to accommodate military trainers.
  Pilot Lounge and briefing room.
  Auxiliary classrooms.
* Coffee Shop.
* Jet fuel availability.

Major Focus: Pilot training.

The airport would benefit by an increase in fuel sales, and possibly in restaurant traffic. However, unless onsite

classroom activities are included the economic benefits may be minimal when compared to the increase in air traffic.

- Historic Site and Northern Arizona Sport Aviation Center, providing a focal point for tourism activities and a staging site for sport aviation events, such as the Copperstate Fly-in, locally-sponsored air shows, or Experimental Aircraft Association (EAA) functions. The airport could be promoted in conjunction with the La Posada Resort, as a tourist destination.

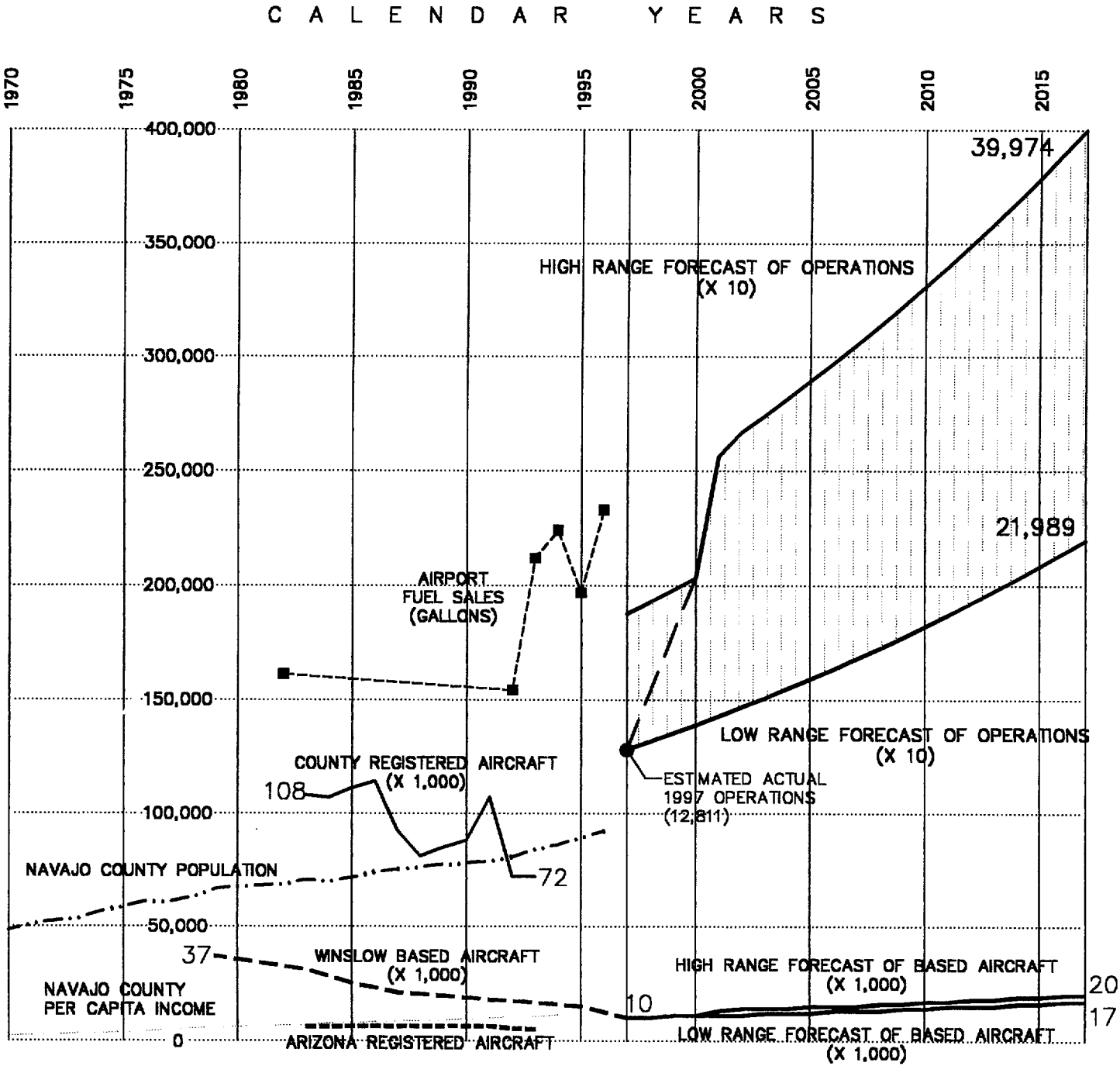
  Requirements:
  Historic Restoration of existing buildings.
  Aviation Museum and/or Interpretive Center.
  * Large transient tiedown apron(s).
  * Coffee Shop.
  Large auto parking area(s).
  Air show staging area (a "historic site" ramp).
  Rental car availability.
  Shuttle service to the La Posada Resort.

  Major Focus: Tourism.

  Direct benefits to the airport would include increased restaurant traffic, and increased fuel sales. In addition to the benefits to the La Posada, other local retail establishments, restaurants and motels/hotels would see an increase in use.

The specific niche market areas presented above may be considered unique parts of an aggregate market base for the airport. Although each niche market area will have its own specific infrastructure improvement needs, there is sufficient overlap between the areas that a broad-based marketing effort could be undertaken.

There does not appear to be any apparent significant conflict between the recommended uses. With careful planning, the Winslow-Lindbergh Regional Airport could serve several specific markets and enjoy a broad base of airport revenue.



WINSLOW-LINDBERGH REGIONAL AIRPORT
FORECAST SUMMARY CHART
1997-2017

FIGURE
2-1

Revised: 12/19/97